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FISH & RICHARDSON P.C. 500 ARGUELLO STREET, SUITE 500 REDWOOD CITY, CA 94063			EXAMINER JUBA JR, JOHN	
			ART UNIT	PAPER NUMBER
			2872	

DATE MAILED: 12/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/075,433

Applicant(s)

SHAO, YANBIN

Examiner

John Juba

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3,5,6,8,12-14 and 18-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,6,8,12-14 and 18-21 is/are rejected.
- 7) ☒ Claim(s) 2 and 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

Claim 12 is objected to because of the following informalities: In the third line of claim 12, it is believed that "components" should read - - component - - . Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

Claims 8 and 12 – 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 is ambiguous as to the manner of performing the first recited step. It is not clear whether the light signal having the first and second component is transmitted from the first *input* port or from the first *output* port onto a polarization beam splitter. The necessity to use the first input port would seem apparent when the steps are performed in the order recited, but there is nothing in the claim requiring the steps to be performed in any particular order. Claims 12 – 14 inherit the same deficiency through their dependency from claim 8.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 18 – 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Fukushima (U.S. Patent number 5,999,313). The circulator of Fukushima (e.g., Fig. 2) may be regarded as comprising

first (1) and second (2) input ports, the first and second input ports each being operable to receive light of a first polarization (p; in addition to s-polarized light);

a first reflector (at the air interface of parallelogrammic prism 54 of port “1”) optically coupled to the first input port;

a non-reciprocal device (56/60 bottom-most in the converter 48 of port “2”) optically coupled to the second input port and operable to convert [incoming] light of the first polarization (p) into light of a second polarization (s);

a polarization beam splitter (50 of the subsidiary beam splitter at port “1”) optically coupled to the first reflector and to the non-reciprocal device, and operable to pass light of the first polarization (p) and reflect light of the second polarization (s) [as it enters port “1”];

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a second reflector (at the air interface of parallelogrammic prism 54 of port "2") optically coupled to the polarization beam splitter [along the forward transmission path from port "1" to port "2"]; and

an output port (3) optically coupled to the second reflector and operable to receive light of the first polarization and light of the second polarization [along the forward transmission path from port "2" to port "3"].

With regard to claim 19, the circulator further comprises a polarizer "38" (of central splitter 40) optically coupled to the non-reciprocal device identified at port "2".

With regard to claim 20, polarizer "38" (of the central beam splitter 40), converter (8) of port "3" and polarizer "50" (of the subsidiary splitter of port "3") fairly constitute an optical isolator in that light entering port "2" is passed to port "3", but not back. The isolator is coupled to the second reflector identified at port "2" in the forward path from port "2" to port "3".

With regard to claim 21, the non-reciprocal device identified at port "2" comprises a half-wave plate (60) and Faraday rotator (56) (Column 5, lines 17 – 36).

Claims 1, 3, 6, 8, 12, 13, 18, 19, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Li (U.S. Patent number 6,487,014). Referring *for example* to Figure 13A and the associated text, Li discloses a circulator (of claim 1) comprising

a first input port (P1) operable to receive light of a first (p) and a second (s) polarization;

a polarization beam splitter (130) optically coupled to the first input port (P1) and operable to reflect the light of the first polarization (p) and pass the light of the second polarization (s);

a reflector (138) optically coupled to the polarization beam splitter;

a non-reciprocal device (134) optically coupled to the reflector and operable to convert the light of the first polarization (p) into light of the second polarization (s) [when the magnetic field is reversed; Col. 13, lines 35 – 45];

a first output port (P4) operable to receive light of the second polarization (s) from the non-reciprocal device (134) [when the field is reversed]; and

a second output port (P2) operable (*i.e.*, when the field is not reversed) to receive light of the second polarization from the polarization beam splitter [via rotator 136].

With regard to claim 3, a polarizer (132) is coupled to the non-reciprocal rotator (134).

With regard to claims 8, 12, and 13, Li discloses a method of operating a switch for transmitting light among a first input port (P1), a first output port (P4), and a second output port (P2), the light having either a first (p) or a second (s) polarization, the method comprising

transmitting a light signal including first and a second component having a first (p) and second (s) polarization, respectively, from the first [input] port (P1) with the first polarization (p) onto a polarization beam splitter (130);

directing (reflecting) the first component onto a first reflector (138);

reflecting the first component of light onto a first non-reciprocal device (134);

changing the polarization of the first component of light from the first (p) polarization to the second polarization [when the field is reversed];

directing the first component into a first output port (P4) [when the field is reversed]; directing the second component of light (s) onto a second non-reciprocal device (136) [by transmission through splitter (130);

maintaining the polarization of the second component of light as it passes through the second non-reciprocal device (136) [when the field is not reversed]; and

directing the second (s) component of light into the second output port (P2) [when the field is not reversed].

With regard to claims 12 and 13, the first component is directed to the first output port (P4) through a polarizer (132) when the field is reversed, whereas the second component is directed into the second output port (P2) via polarizer (132) when the field is *not* reversed.

With regard to claims 18, 19, and 21, the circulator of Li (e.g., Fig. 13B) may be regarded as comprising

first (P4) and second (P2) input ports, the first and second input ports each being operable to receive light of a first polarization (s; in addition to p-polarized light);

a first reflector (138) optically coupled to the first input port (P4) [via splitter (132) and rotator (134)];

a non-reciprocal device (136) optically coupled to the second input port (P2) [via splitter (132) and mirror (139)] and operable to convert light of the first polarization (s)

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[from the second input port (P2)] into light of a second polarization (p) [traveling toward (P3)];

a polarization beam splitter (130) optically coupled to the first reflector (138) and to the non-reciprocal device (136), and operable to pass light of the first polarization (s) [to port (P1) from port (P4) where it originated as p-polarized light] and reflect light of the second polarization (p) [to port (P3) from port (P2), where it originated as s-polarized light];

a second reflector (139) optically coupled to the polarization beam splitter (130) [via rotator (136)]; and

an output port (P3) optically coupled to the second reflector (139) and operable to receive light of the first polarization (s) [from port (P2) where it originated as p-polarized light] and light of the second polarization (p) [from port (P2) where it originated as s-polarized light].

With regard to claim 19, the circulator further comprises a polarizer (132) optically coupled to the non-reciprocal (136) [via mirror (139)].

### ***Allowable Subject Matter***

Claims 2 and 5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 14 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening



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claims. The following is a statement of reasons for the indication of allowable subject matter:

The prior art, taken alone or in combination, fails to teach or to fairly suggest an isolator optically coupled to the polarization beam splitter in the combination of claim 2;

an optical isolator coupled to the reflector in the combination of claim 5; or the method wherein the first and second components of light are sent onto a polarization beam splitter *through an isolator*, as recited in the method of claim 14.

### ***Response to Amendment***

Applicant's amendment of claim 1 is sufficient in overcoming the previous rejection of claims 1 – 3, 5, and 6 under 35 U.S.C. §112, first paragraph. The cancellation of claims 4 and 7 obviates their continued rejection on these grounds.

Applicant's amendment of claims 1 and 8 is sufficient to overcome the rejection of claims 1, 3, 6, 8, and 12 under 35 U.S.C. §102(b) as being anticipated by Fukushima (U.S. 5,999,313). The cancellation of claims 4 and 7 obviates their continued rejection on these grounds. The examiner understands the amendment of claim 1 to require "the light of the first polarization" converted by the non-reciprocal device to be the said-same light of the first polarization as received by the first port and to require that the first output port is operable to receive light of the second polarization *from* the non-reciprocal device which is "the light of the first polarization" converted into light of the second polarization by the non-reciprocal device as recited in claim 1.

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Applicant's amendment of claims 1 and 8 is sufficient to distinguish over Pan, et al (U.S. Patent number 5,689,593). The ports of Pan, et al are operable to receive light of first (extraordinary) and second (ordinary) orthogonal polarization states. These polarization states are not the same state operated on by the polarization beam splitter (e.g., 162) which reflects one (s) polarization and transmits the other (p) orthogonal polarization. Accordingly, the structure of Pan, et al does not cooperate with the non-reciprocal device and reflector in the manner now recited. Accordingly, the rejection of claims 1, 3, 8, and 12 under §102 (b) as being anticipated by this reference has been overcome. The cancellation of claim 4 obviates any continued rejection on these grounds.

The remaining teachings of Pan, et al relied upon as motivating the inclusion of an isolator fails to cure the aforementioned deficiency, and the rejection of claims 2, 5, and 14 under §103(a) as being unpatentable over this reference has been overcome by amendment.

Applicant's remarks concerning newly presented claim 22 as containing the subject matter of claims 10 and 11 previously indicated as being allowable are unpersuasive, in that no claim numbered "22" was presented. Clearly these particular remarks were not intended to be directed to new apparatus claims 18 – 21, since prior claims 10 and 11 were method claims. Applicant's amendment of September 22, 2003 included (on Pgs. 2 & 3 thereof) amendments to specification, amended claims 1 – 3, 5, 6, 8, and 12 – 14 on Pages 4 – 6 thereof, claims 4, 7, 9 – 11, and 15 – 17 being canceled, newly present claims 18 – 21 on Pages 6 and 7 thereof, and remarks on 8 –

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10 thereof. There appear to be no pages missing. By the time the examiner reached this portion of the remarks section, the Office action was substantially complete. Accordingly, presentation of an additional claim (*i.e.*, claim "22") by supplementary amendment was not solicited.

### **Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

PTO 03-4026 is an English-language translation of YAMAICHI ELECTRIC (JP 61-38934) cited in the last Office action, and demonstrates that the structure relies upon electro-optic rotators exhibiting induced birefringence. Rotators of this type are *reciprocal* rotators, rather than non-reciprocal.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Juba whose telephone number is (703) 308-4812. The examiner can normally be reached on Mon.-Fri. 9 - 5.

**On or about January 20, 2004, the examiner's new phone number is expected to be (571) 272-2314 at the Alexandria campus.**

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Drew Dunn can be reached on Mon.- Thu., 9 - 5.

The centralized fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for *all* communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

  
JOHN JUBA  
PRIMARY EXAMINER  
Art Unit 2872

December 3, 2003